FIG.1

10

26

20

28

29

12

48

18

46

50

34

47

52

45

46

30

44

38

36

32

42

41

40

16

FIG. 2

Fig. 3

Fig. 4

FIG. 5

FIBERGLASS SANDZINESS

SEISMIC SIMULATION 2000 LBS. 9" DROP (9'-6" MOMENT ARM)

◇ 0	70
□ 1	71
△ 2	72
✕ 3	73
✳ 4	74
○ 5	75
+ 6	76

70,470

49,590

30,160

16,240

73

72 74

75

71

76

70

LOAD(psi.)

80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
-10,000
-20,000

TIME(sec.)

0.0000
0.0022
0.0044
0.0067
0.0089
0.0111
0.0133
0.0156
0.0178
0.0200
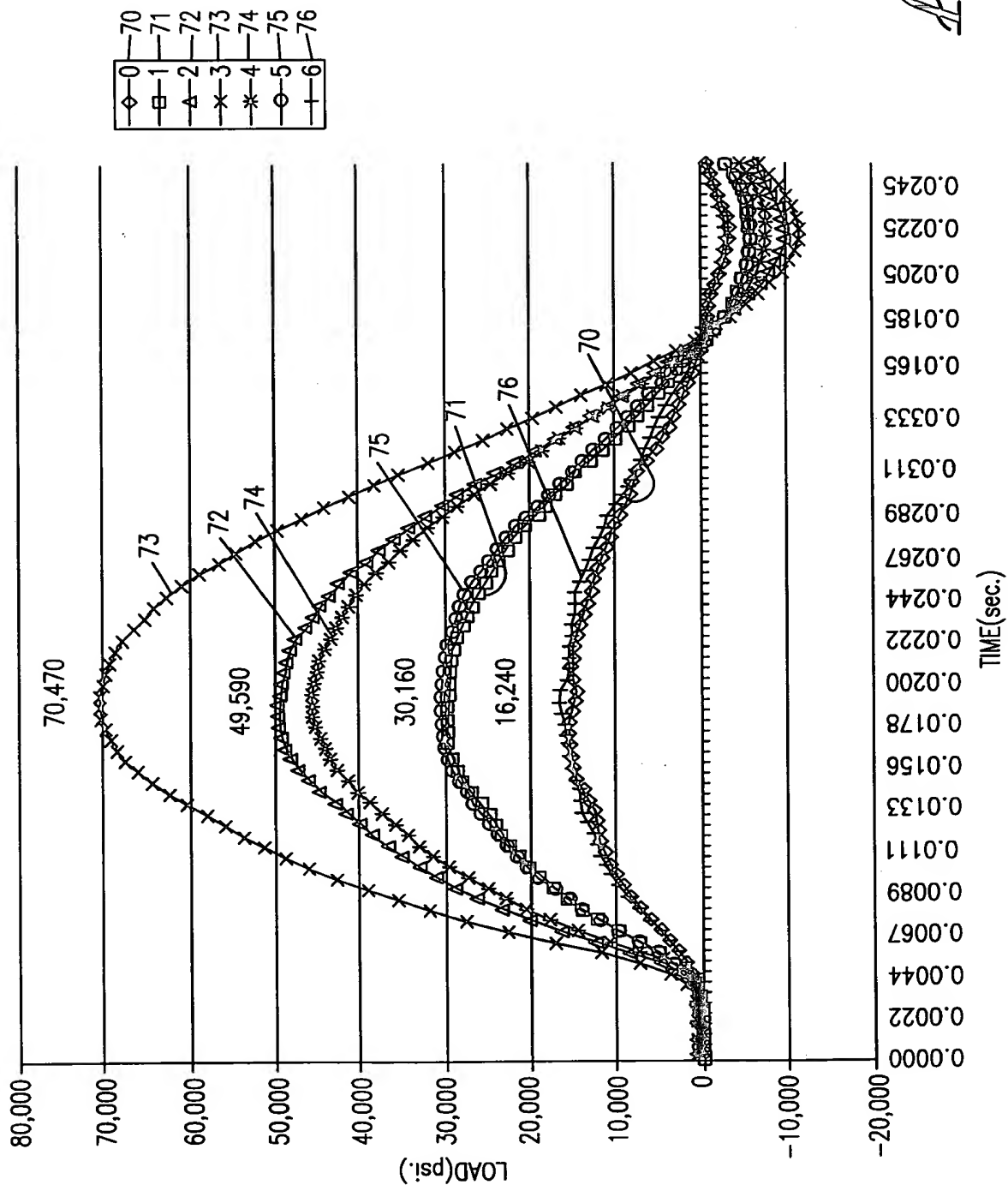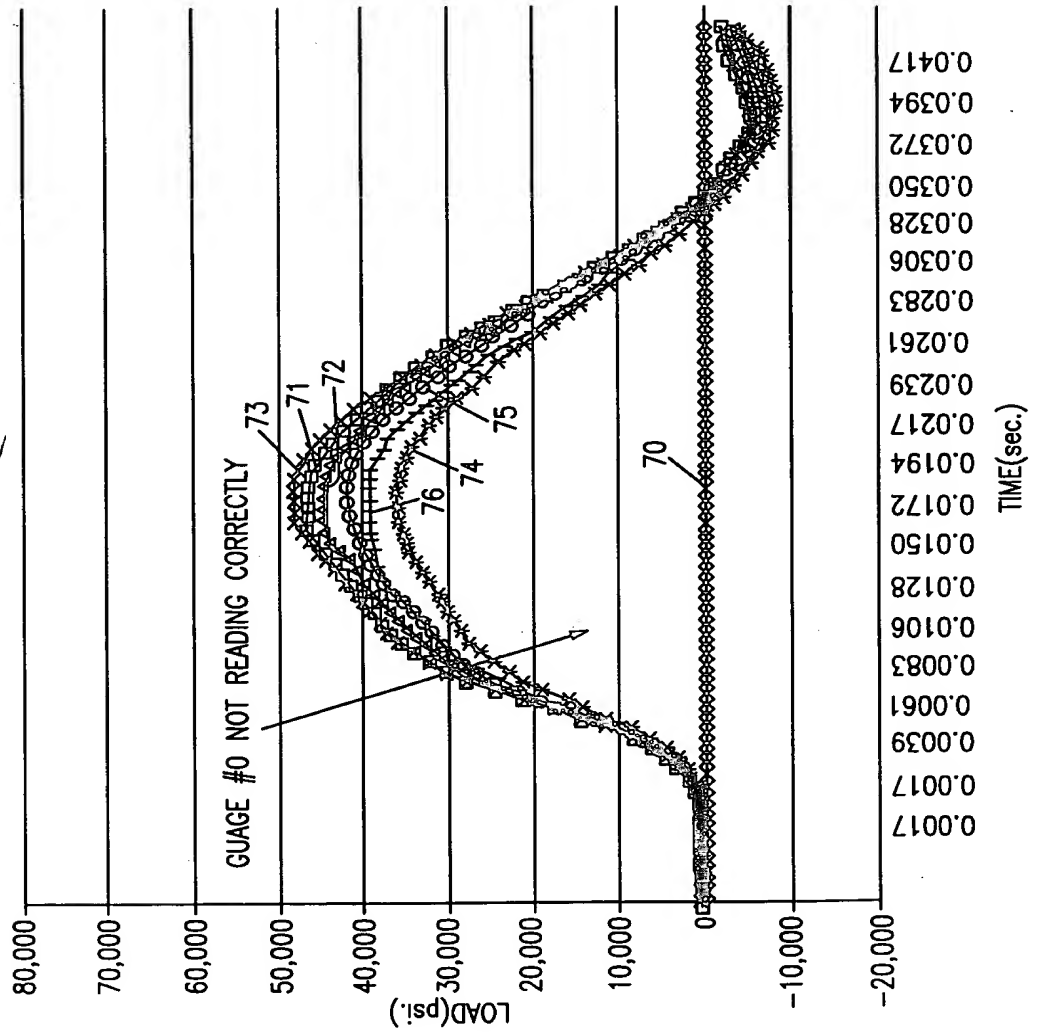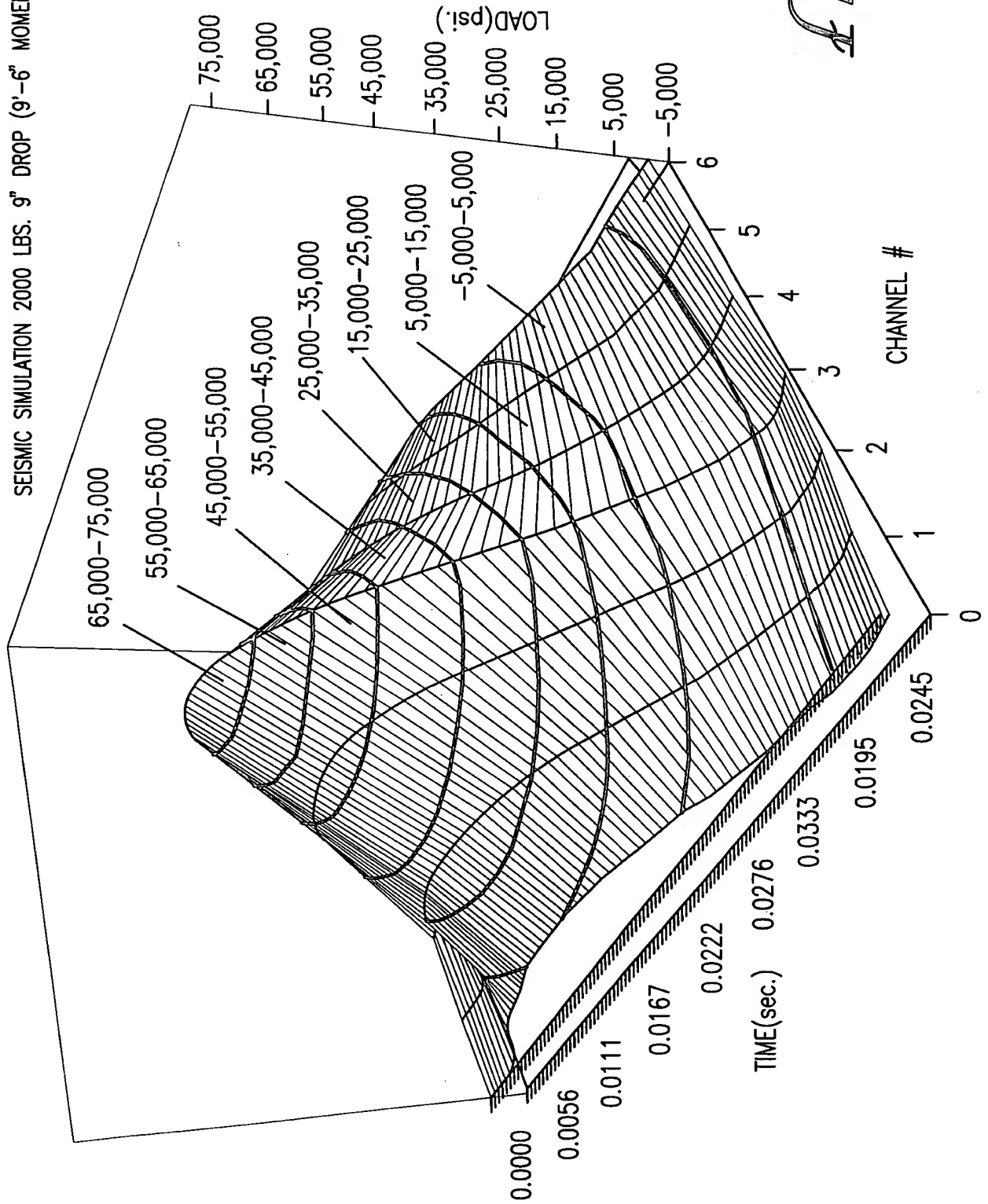0.0222
0.0244
0.0267
0.0289
0.0311
0.0333
0.0165
0.0185
0.0205
0.0225
0.0245

FIG. 6

SEISMIC SIMULATION 2000 LBS. 9" DROP (9'-6" MOMENT ARM)

1" THICK BY 8" HIGH VERT. PLATE WITHIN COL. FLANGE W/TAPERED 1" THICK CONTINUITY PLATE. 4-1/2" SLOT CUT IN COL. WEB. NOTE CH 0 NOT READING CORRECTLY. (SET TO 0 PSI.)

GUAGE #0 NOT READING CORRECTLY

SEISMIC SIMULATION 2000 LBS. 9" DROP (9'-6" MOMENT ARM)

LOAD(psi.)

- 75,000
- 65,000
- 55,000
- 45,000
- 35,000
- 25,000
- 15,000
- 5,000
- -5,000

65,000-75,000

55,000-65,000

45,000-55,000

35,000-45,000

25,000-35,000

15,000-25,000

5,000-15,000

-5,000-5,000

CHANNEL #

0   1   2   3   4   5   6

TIME(sec.)

0.0000
0.0056
0.0111
0.0167
0.0222
0.0276
0.0333
0.0195
0.0245

FIG. 7

SEISMIC SIMULATION 2000 LBS. 9" DROP (9'-6" MOMENT ARM)
1" THICK BY 8" HIGH VERT. PLATE WITHIN COL. FLANGE W/TAPERED 1" THICK CONTINUITY
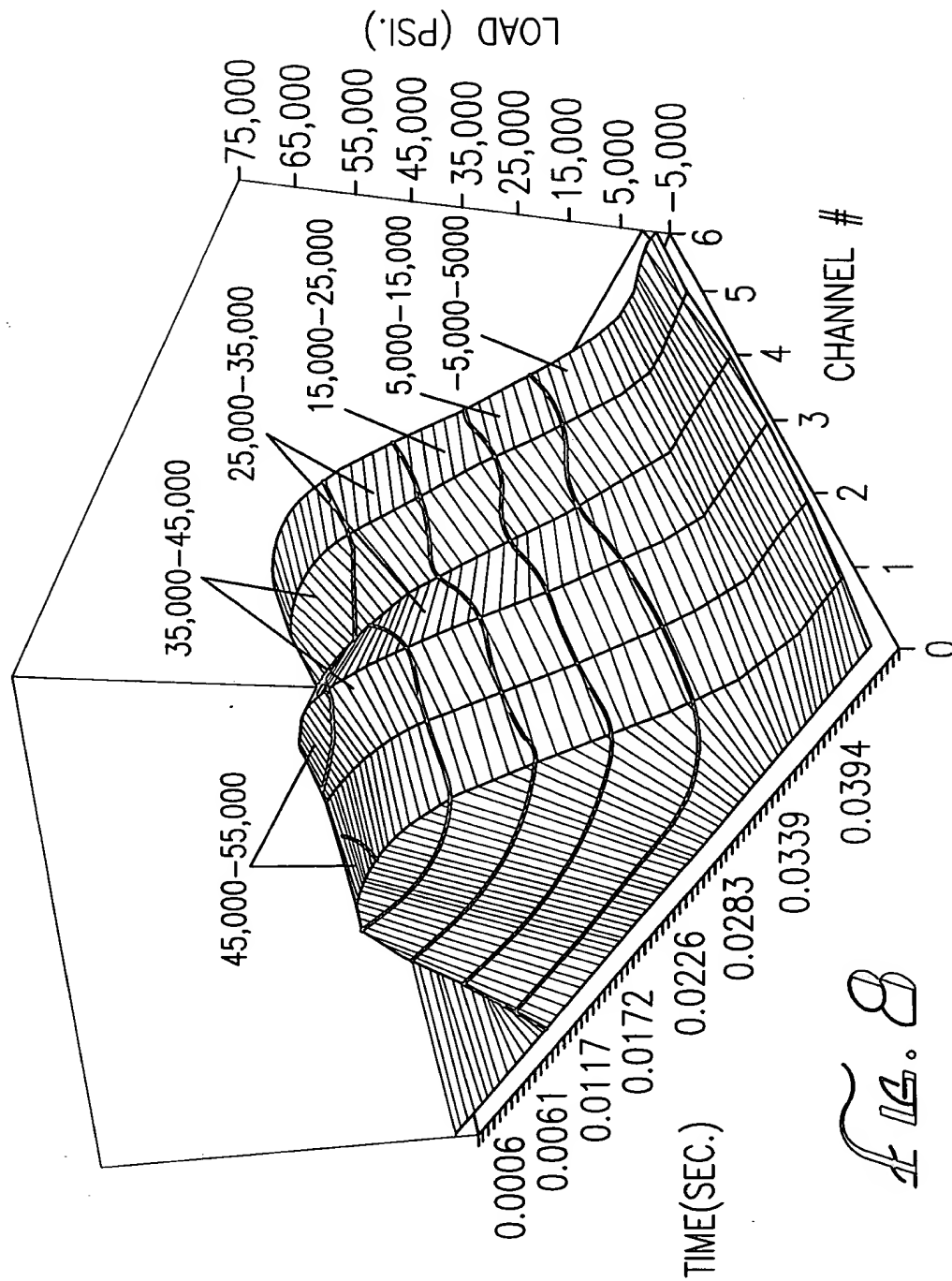PLATE. 4-1/2" SLOT CUT IN COL. WEB. NOTE CH 0 NOT READING CORRECTLY. (SET TO
0 PSI.)

Fig. 8

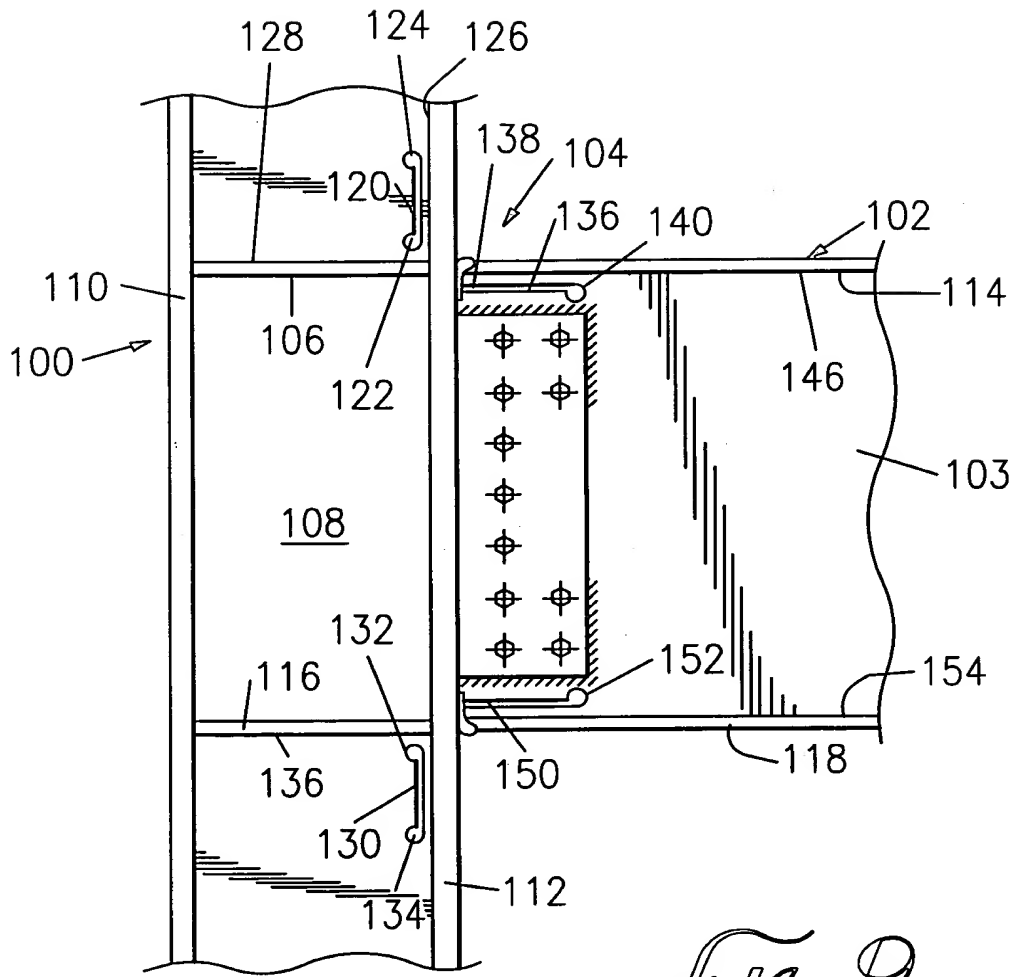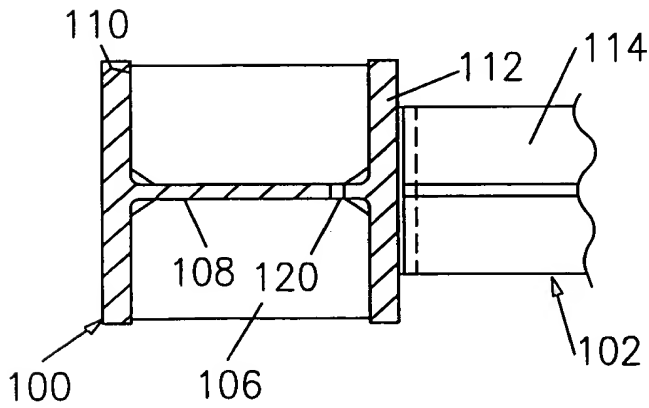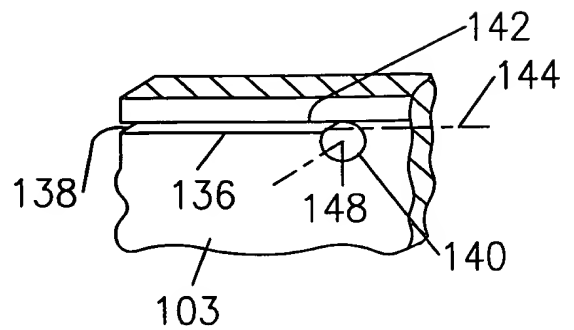*fig.9*

fig.10

fig.11

126

124

120

128

112

fig. 12

164   162   156

160   174   158

176

180

172   168   178

166

170

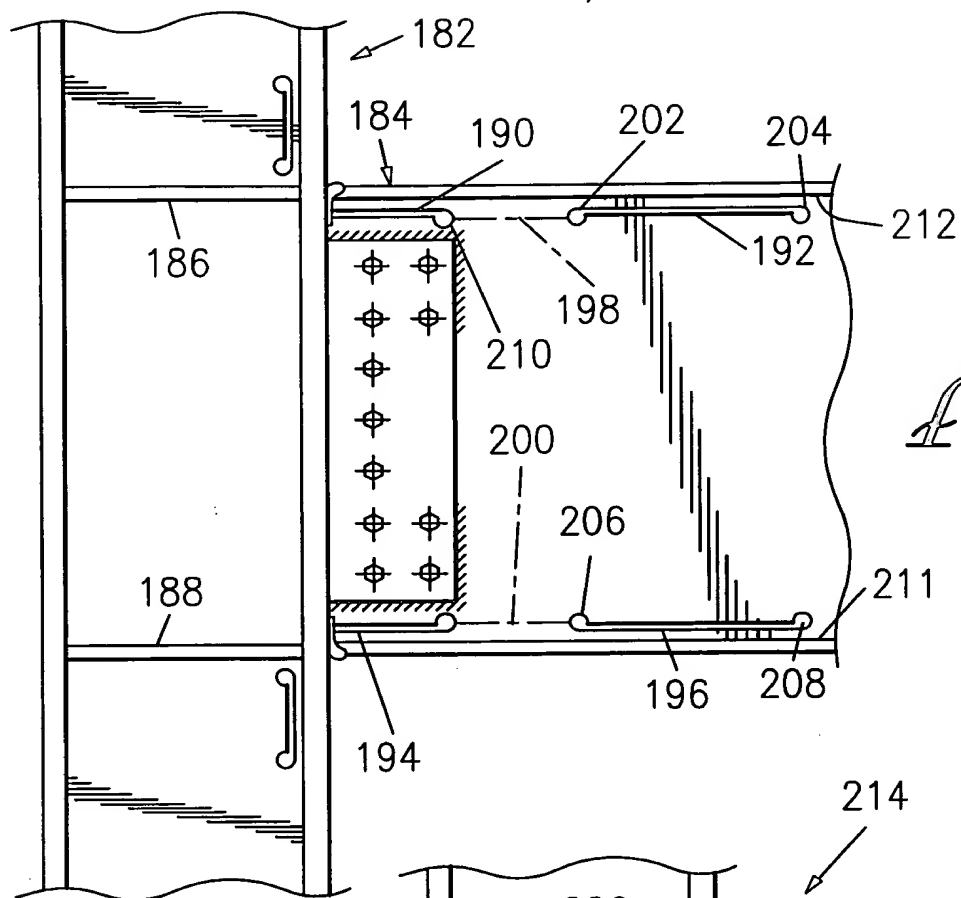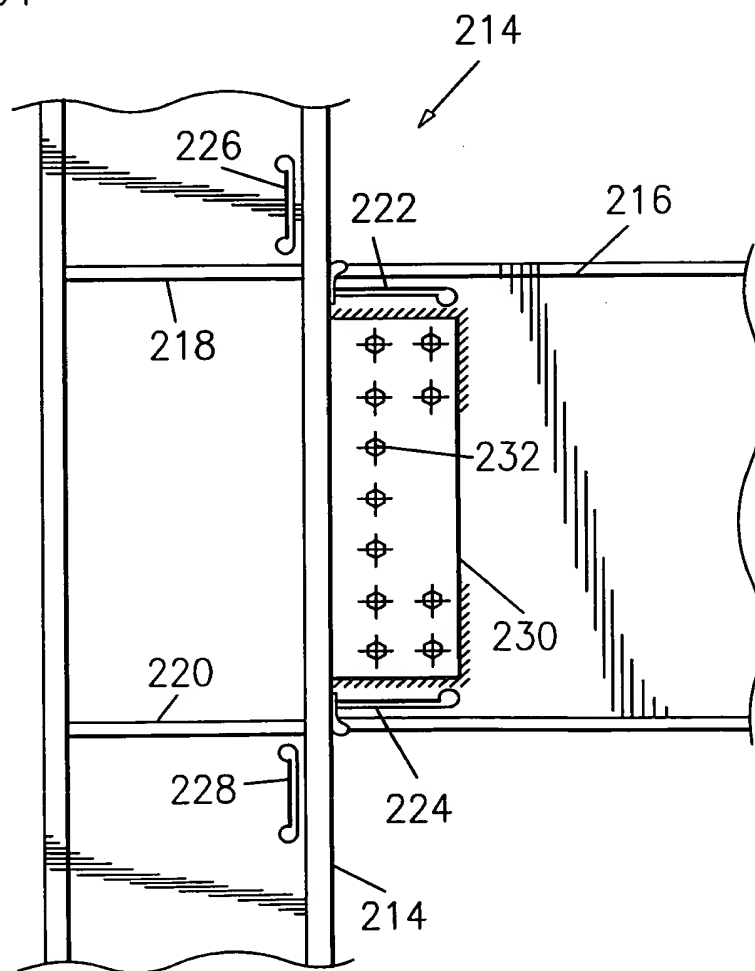_fig. 13_

Fig.14
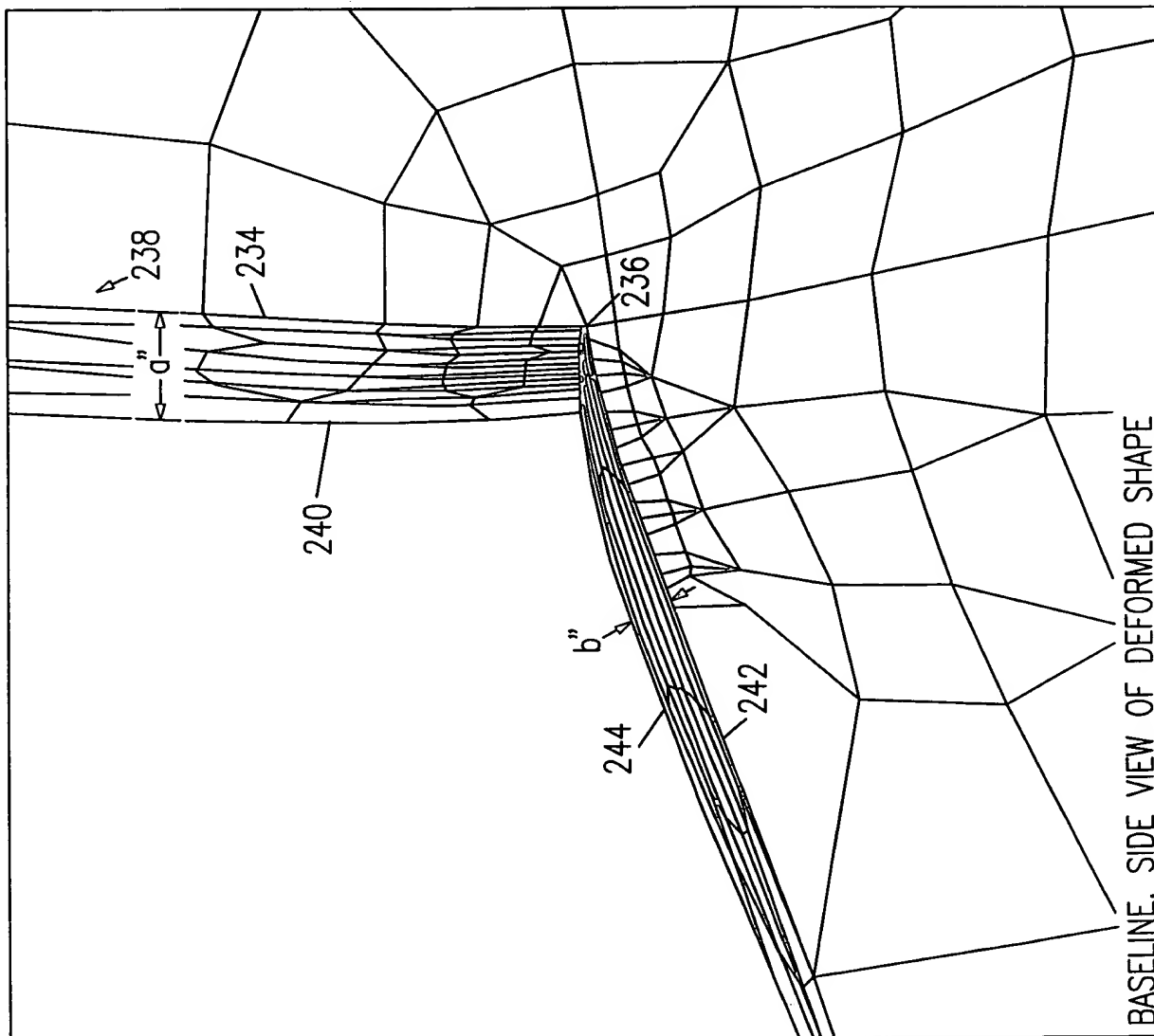
Fig.15

ANSYS 5.1   34
JULY 31, 1995
09:53:34
DISPLACEMENT
STEP=1
SUB=1
TIME=1
RSYS=0
DMX=1.114
SEPC=26.872

*DSCA=50
XV=1
*DIST=4.153
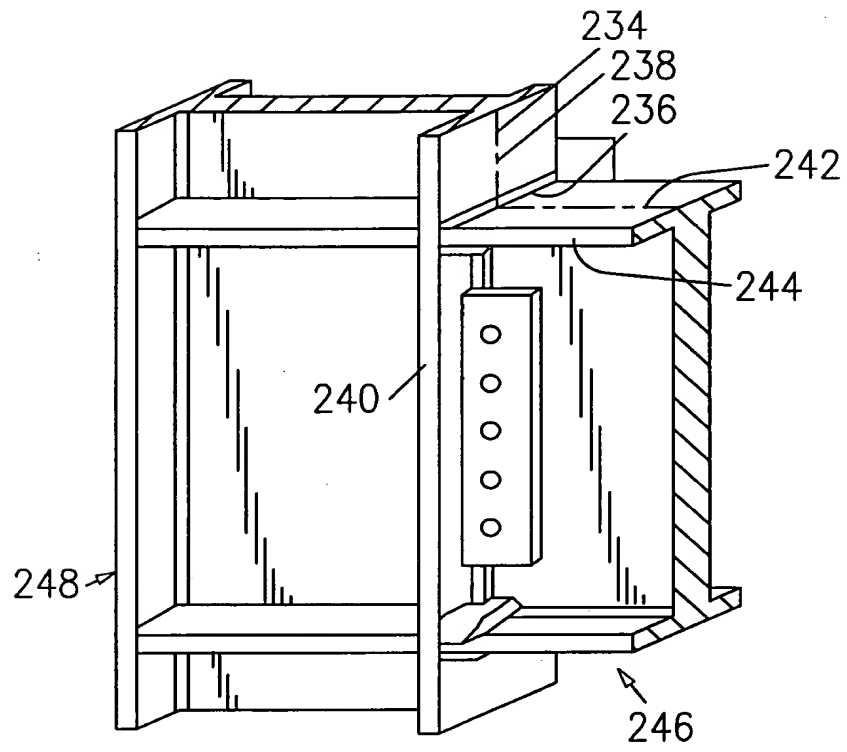*XF=-3.943
*YF=12.822
*ZF=4.91
CENTROID HIDDEN

238

234

236

240

a''

b''

242

244

BASELINE, SIDE VIEW OF DEFORMED SHAPE

Fig. 16

234
238
236
242
244
240
248
246

FIG.17

ANSYS 5.1   34
JUL 31, 1995
12:13:23
DISPLACEMENT
STEP=1
SUB=1
TIME=1
RSYS=0
DMX=1.052
SEPC=25.25

*DSCA=50
XV=1
*DIST=6.487
*XF=-3.912
*YF=13.41
*ZF=6.221
CENTROID HIDDEN

254

252

"c"

"d"

250

256

258

BEAM SLOT WITH CONTINUITY PLATE

Fig. 18

ANSYS 5.1   34
AUG 8, 1995
23:47:27
DISPLACEMENT
STEP=1
SUB=1
TIME=1
RSYS=0
DMX=1.067
SEPC=24.838

*DSCA=50
XV=1
*DIST=6.361
*XF=-3.912
*YF=14.574
*ZF=5.901
CENTROID HIDDEN
EDGE

Fig. 19

W14x176 COLUMN, W27x94 BEAM, BEAM AND COLUMN SLOTS, CONTINUITY PLATE

260
266
264
262
270
268

ANSYS 5.1 34
AUG 21, 1995
13:11:27
NODAL SOLUTION
STEP=1
SUB=37
TIME=3.445
UX
TOP
RSYS=0
DMX=3.544
SMN=-0.153612
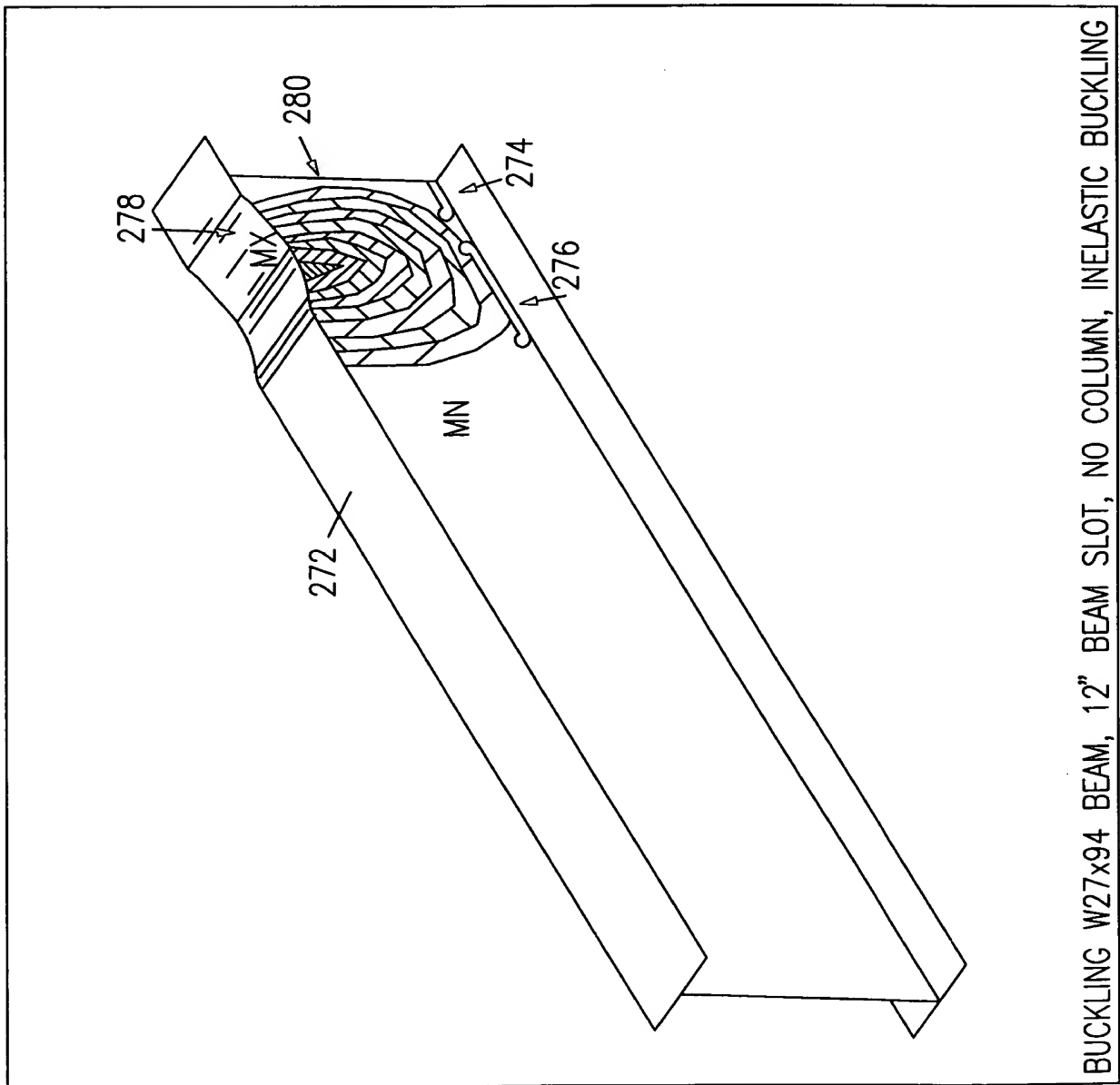SMX=2.209

-0.153612
0.108884
0.37138
0.633876
0.896371
1.159
1.421
1.684
1.946
2.209

Fig. 20

BUCKLING W27x94 BEAM, 12" BEAM SLOT, NO COLUMN, INELASTIC BUCKLING

FORCES: 544/1960

DRAFT
ATC–24 S.E 'BMSLT1A' AUGUST 22, 1995
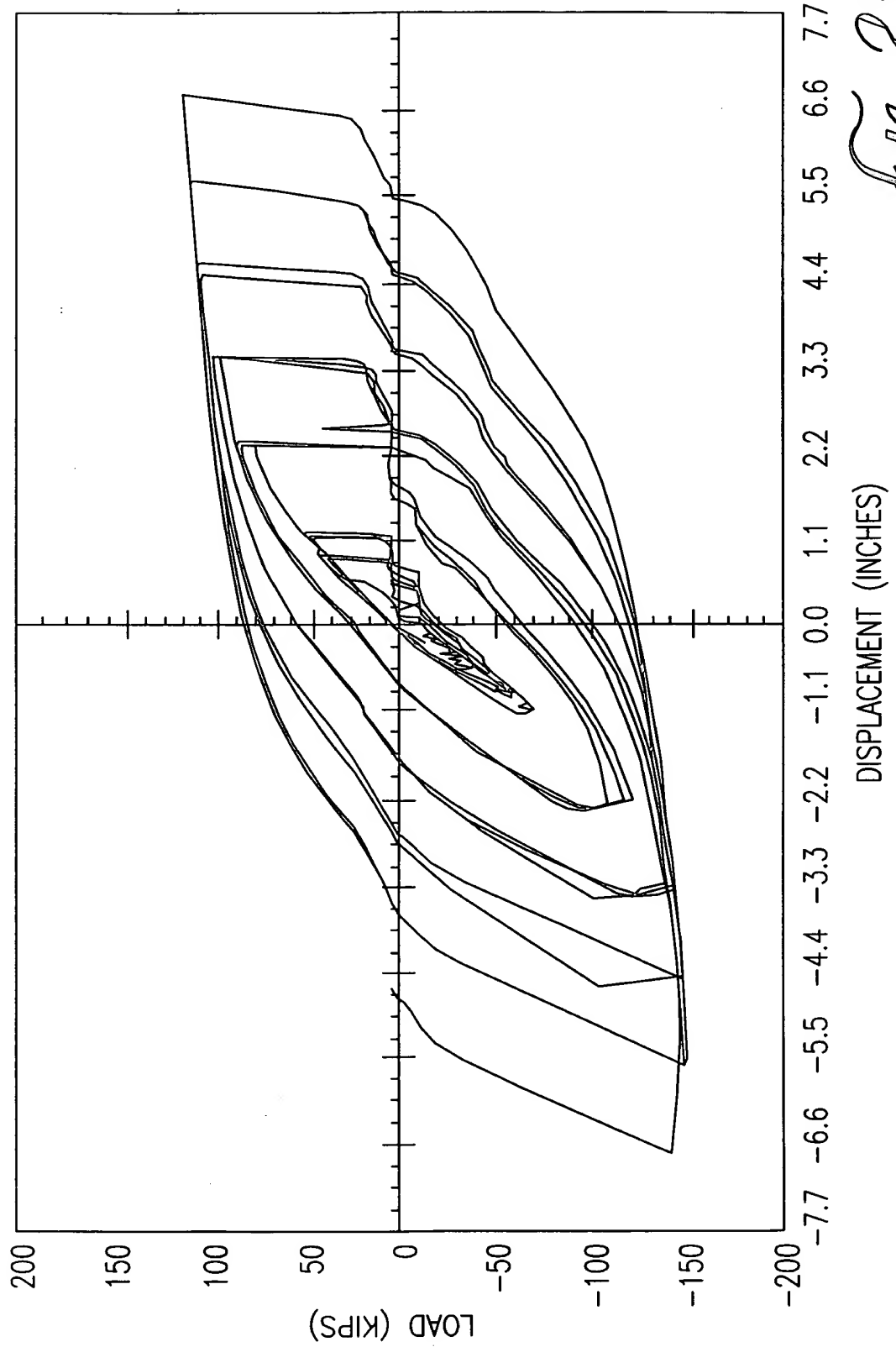
Fig. 21

DISPLACEMENT (INCHES)

LOAD (KIPS)

FIG. 22

FIG. 23

Fig. 24

29—ACCELEROMETER (END OF BEAM)
30—DEFLECTION (END OF BEAM)

W 27 x 94 BEAM

DEFLECT. GUAGE
STRAIN GUAGE

0.5"
1.5"
1.5"
1.5"
1.5"
1.5"
1.5"
0.5"

6.(12)
5.(11)
4.(10)
3
2.(9)
1.(8)
0.(7)

.55"

328
23
326
324
322
330
332
334
24

26
28
25
27

X 14 x 176 COLUMN

WALL

TOP. (#) UNDERSIDE

ANSYS 5.1
DEC 12, 1994
16:50:27
PLOT NO. 1
NODAL SOLUTION
STEP=1
SUB=1
TIME=1
SZ   (AVG)
MIDDLE
RSYS=0
DMX=0.169782
SMN=−23234
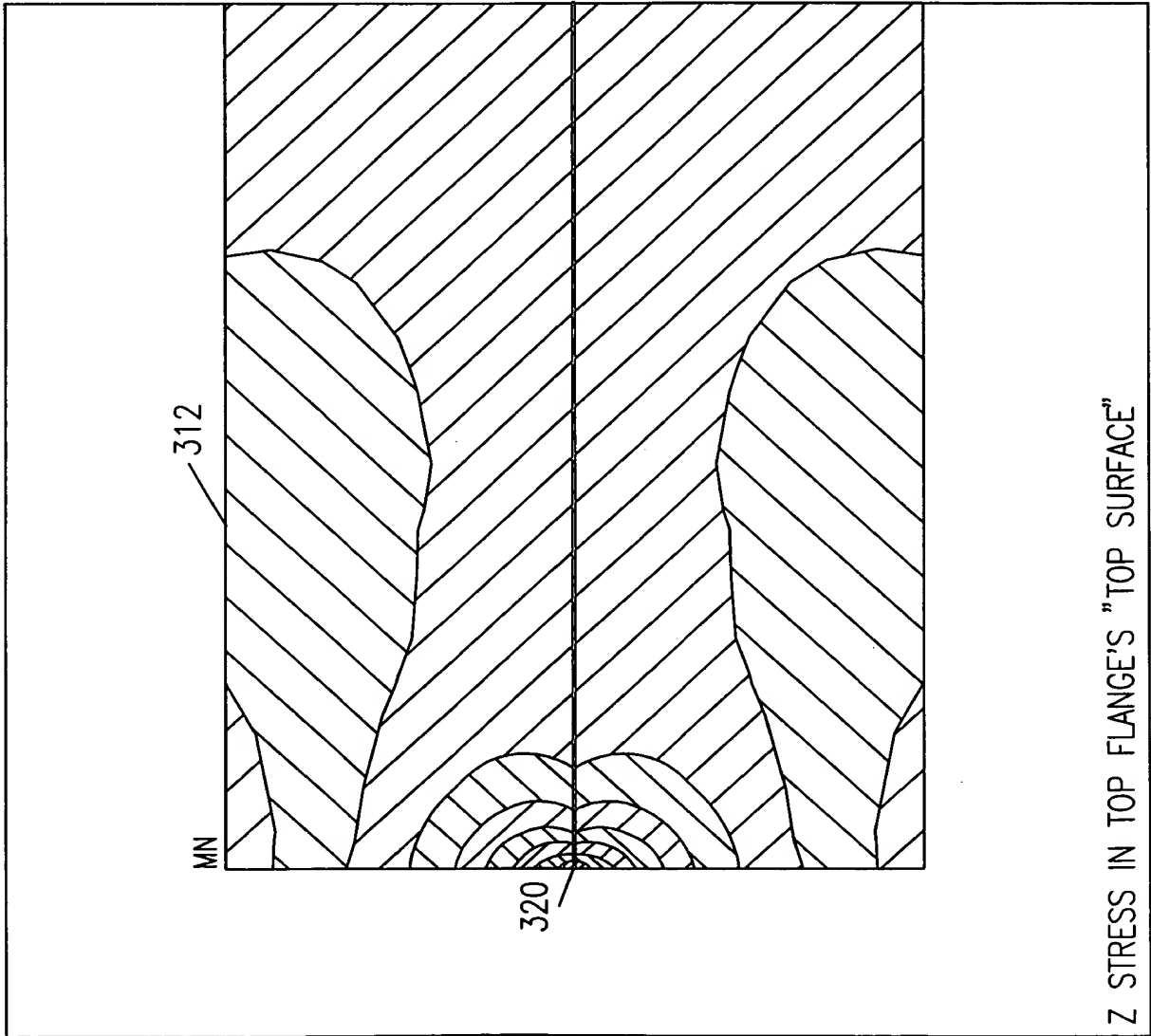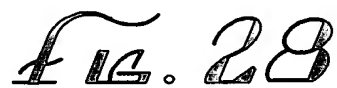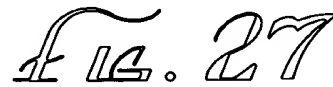SMX=23234

-23234
-18071
-12908
-7745
-2582
2581
7745
12908
18071
23234

Fig. 25
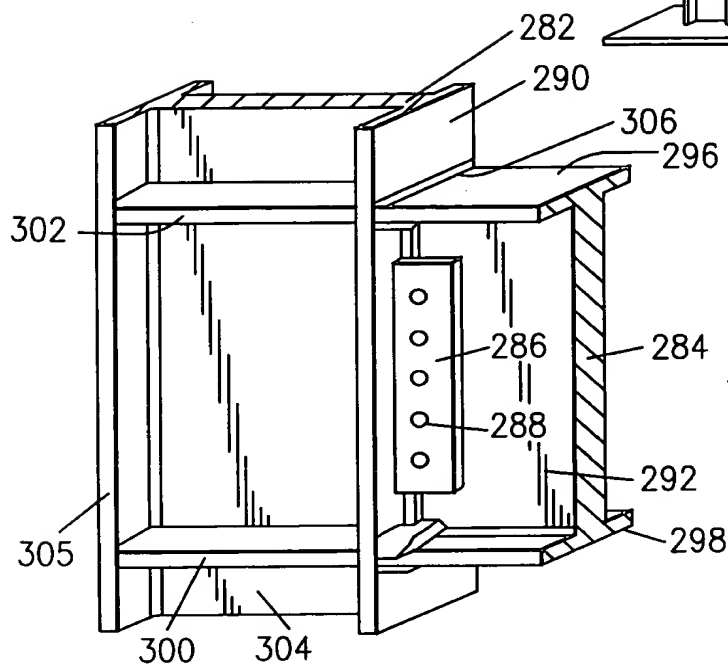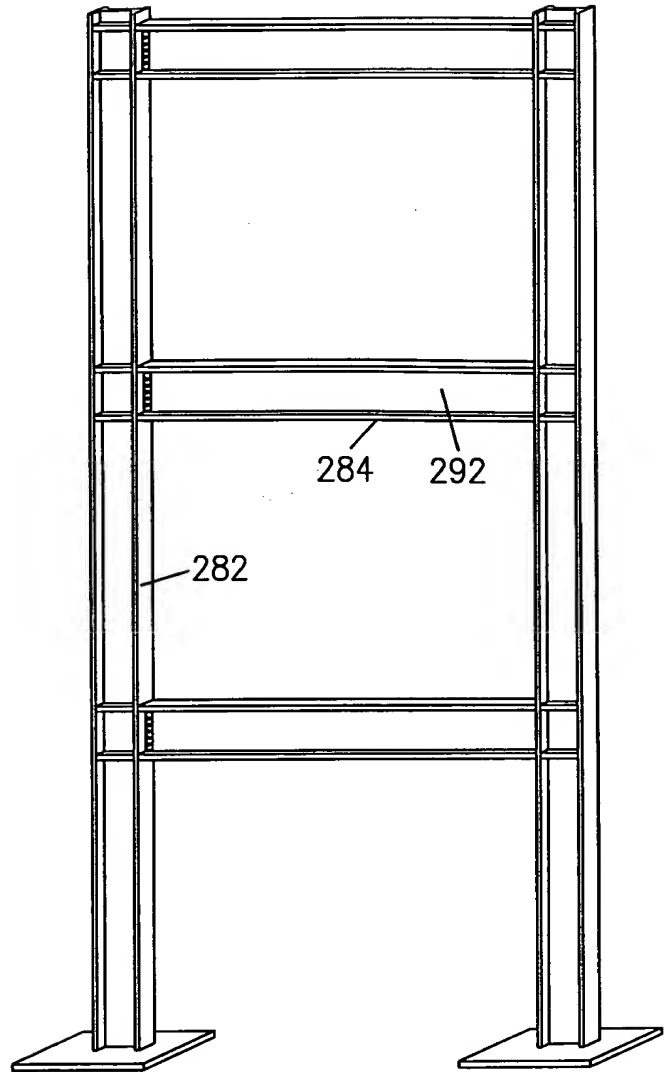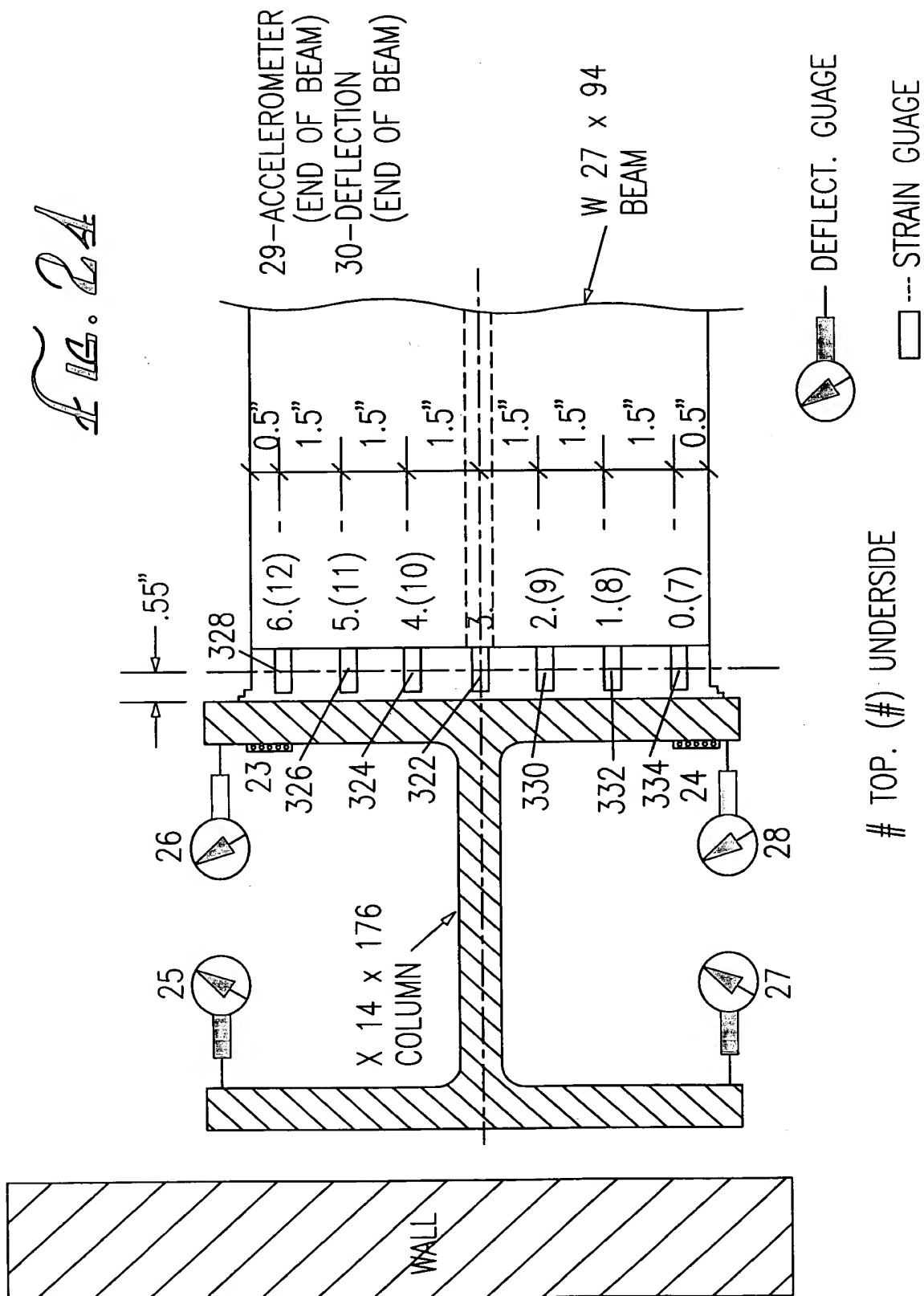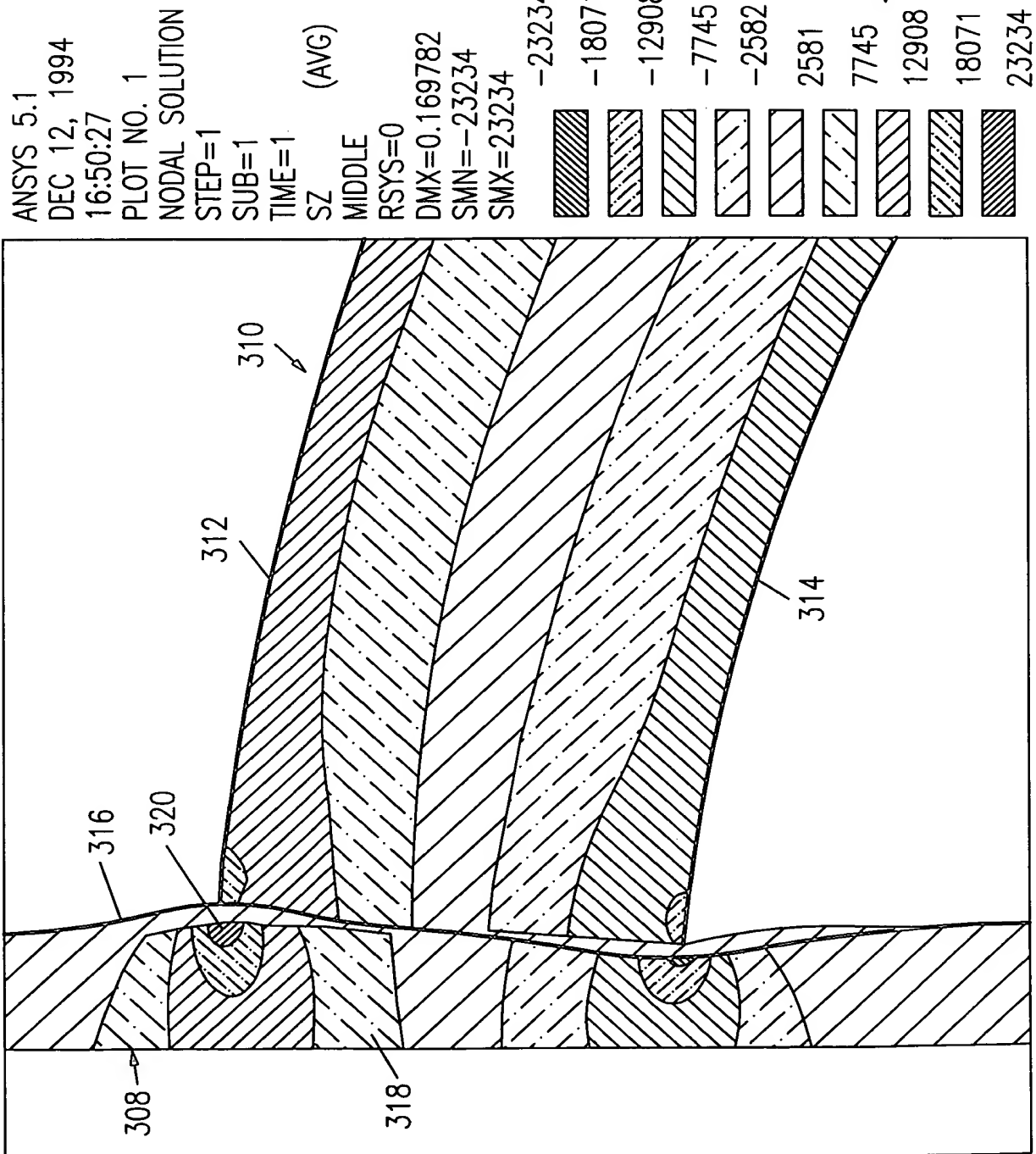
ANSYS 5.1
DEC 12 1994
11:12.33
PLOT NO. 1
NODAL SOLUTION
STEP=1
SUB=1
TIME=1
SZ   (AVG)
BOTTOM
RSYS=0
DMX=0.169781
SMN=1244
SMNB=735.877
SMX=41405
SMXB=42926

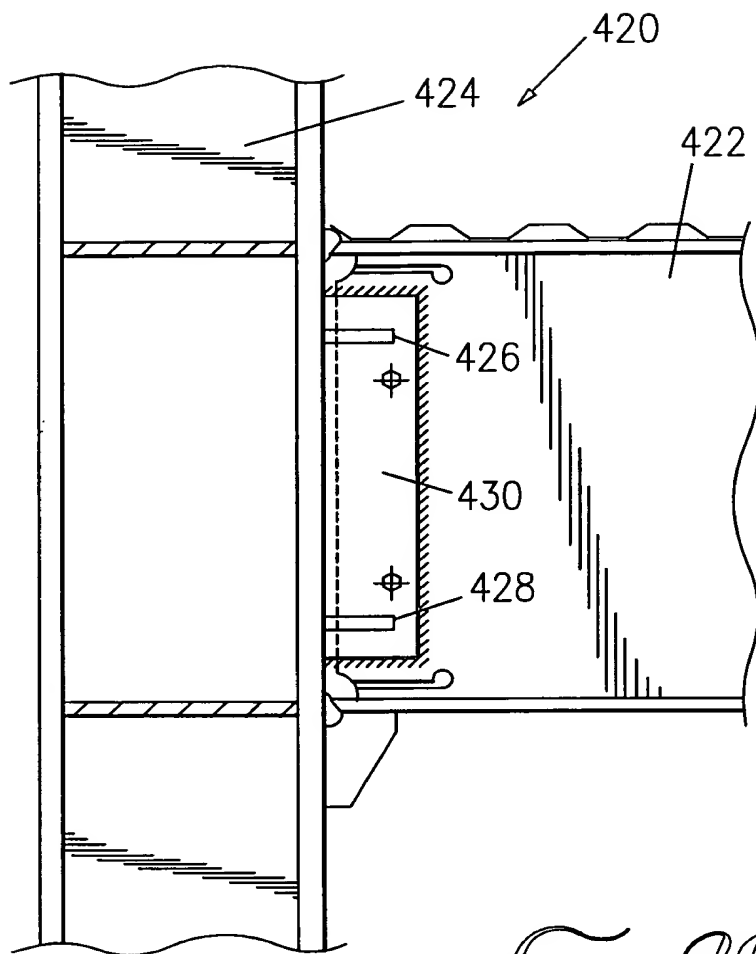1244
5706
10168
14631
19093
23555
28018
32480
36942
41405

312

320

MN

Z STRESS IN TOP FLANGE'S "TOP SURFACE"

Fig. 26

400

404

460

402

410

406

401

412

418

414

fig. 27

402

401

404

408

fig. 28

420

424

422

426

430

428

fig. 29

432

440

436

438

1 1/2 x "BFW"

1/8" WIDE SLOT

"K" VARIES
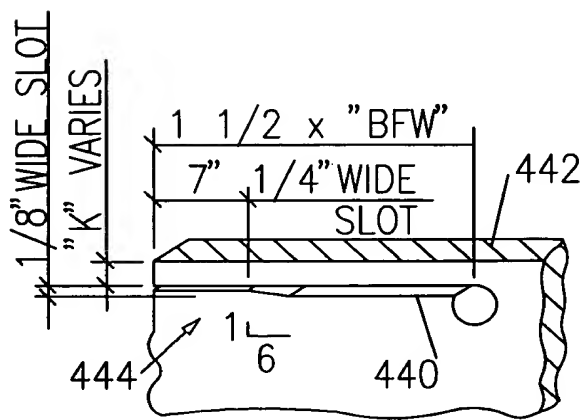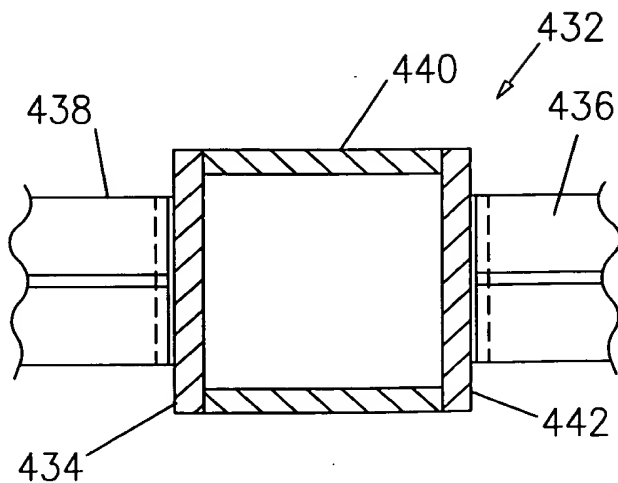
7" 1/4" WIDE SLOT

442

444

1
6

440

fig. 31

434

442

fig. 30

● Develop required plate strength at the column face using ATC-24 moment diagram

$\Delta M = Z_b \sigma_y (I_p/(I_b - I_p))$

$M_{p\,beam} = Z_b \sigma_y$

I_p

I_b

Fig. 32
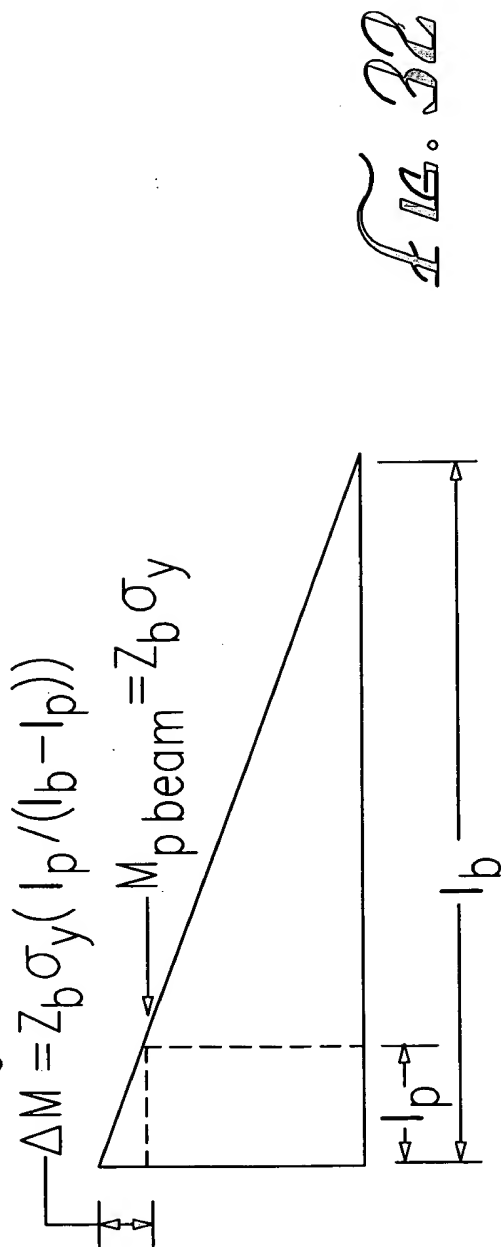
● Use ATC-24 moment diagram to compute the web plastic hinge and slot length measured from end of slot to shear plate.

Z_f = Flange Plastic Modulus
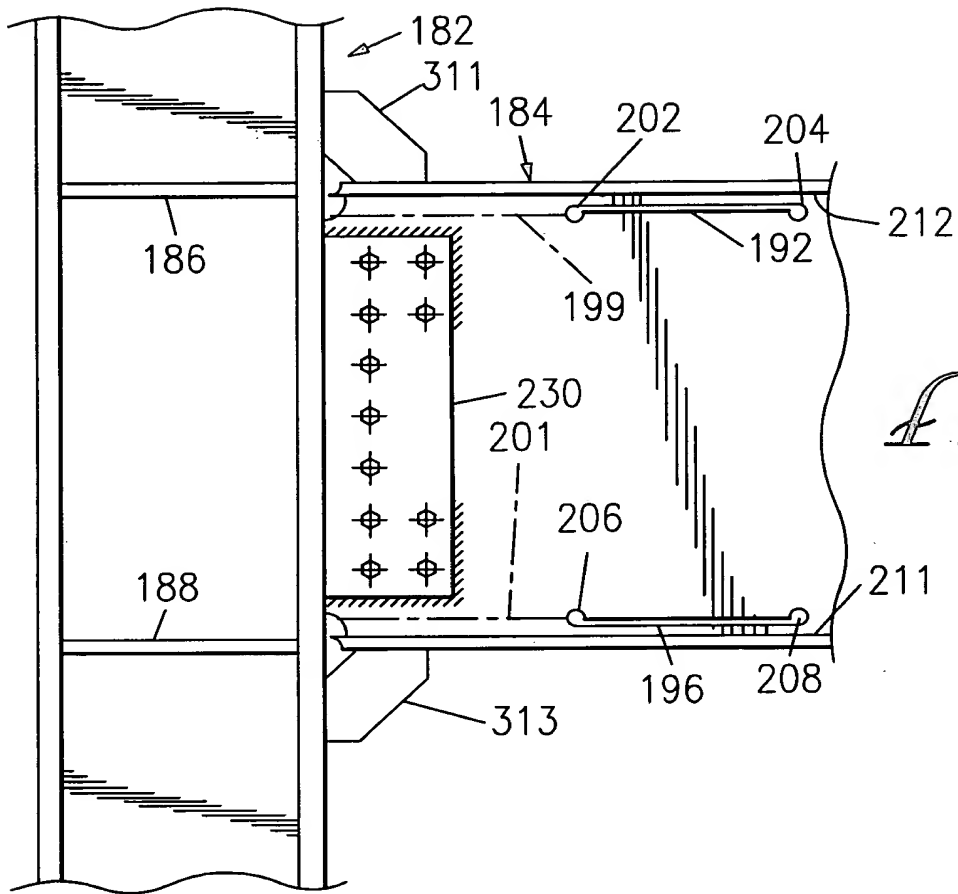S_w = Web Elastic Modulus

M_{max}

$M_p = Z_b \sigma_y$

$M_S = (Z_f + S_w) \sigma_y$

Web Plastic Hinge Length

I_p

I_S

I_b

$I_S = I_b - (I_b - I_p)(Z_f + S_w)/Z_b$

Fig. 33

FIG. 34